GAS DISCHARGE LAMP

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The present invention relates in general to a gas discharge lamp, specifically a HID lamp, more specifically a metal halide lamp.

Gas discharge lamps are commonly known. In general, they comprise a light transmitting vessel enclosing a discharge chamber in a gastight manner, an ionizable filling and a pair of electrodes located opposite each other in the discharge chamber, each electrode being connected to an associated current conductor which extends from the discharge chamber through the lamp vessel to the exterior. During operation, a voltage is applied across said electrodes, and a gas discharge occurs between said electrodes causing a lamp current to flow between the electrodes. Although it is possible to drive an individual lamp within a relatively wide range of operating voltages and/or currents, a lamp is typically designed for being operated at a specific lamp voltage and lamp current and thus to consume a specific nominal electric power. At this nominal electric power, the lamp will generate a nominal amount of light. Since HID lamps are commonly known to persons skilled in the art, it is not necessary to discuss their construction and operation here in more detail.

While a low-pressure gas discharge lamp is typically operated with resonant current, i.e. current having a sine-shaped waveform, a high-pressure discharge lamp is typically operated by supplying commutating DC current. An electronic ballast or driver for such a lamp typically comprises an input for receiving AC mains, a rectifier for rectifying the AC mains voltage to a rectified DC voltage, a DC/DC upconverter for converting the rectified mains DC voltage to a higher DC voltage, a downconverter for converting said higher DC voltage to a lower DC voltage (lamp voltage) and a higher DC current (lamp current), and a commutator for regularly changing the direction of this DC current. The downconverter serves as a current source. Typically, the commutator operates at a frequency in the order of about 100 Hz. Therefore, in principle, the lamp is operated at constant current magnitude, the lamp current regularly changing its direction within a very brief time (commutating periods) in a symmetric way, i.e. an electrode is operated as a cathode during 50% of each current period and is operated as an anode during the other 50% of each current period. This mode of operation will be referred to as square-wave current operation.